

## APPENDIX 4-A

## STORAGE OF INDIUM METAL

1. *Description*

a. *Form.* Indium Metal, 4N grade, Type 1 or Type 2, is received for storage in the form of ingots which shall have a uniform trapezoidal shape or uniform rectangular shape with square or rounded edges. The top and bottom surfaces shall be relatively flat and parallel.

b. *Surface Characteristics.* Indium is a silvery white metal with a bluish cast. Surfaces of the ingot shall be clean and free of dirt, grease, oil, cleaning residues, etc. The surface may only be slightly rough from the casting process and shall have no voids, or shrinkage cavity. There shall be no incompletely melted metal on any part of the surface. All ingots in a lot shall be solid and sound.

c. *Dimensions.* Nominal ingot dimensions are listed below for the two types of Indium.

	<u>Weight</u>	<u>Length</u>	<u>Width</u>	<u>Height</u>
Type 1	100 tr. oz. (3.11 kg.)	8.50 in. / 215.9 mm.	3.25 in. / 82.5 mm.	1.25 in. / 31.75 mm.
Type 2	10 kg.	340/345 mm. (bottom/top)	85/95 mm. (bottom/top)	45 mm.

d. *Production Lot Size.* Each ingot shall be traceable to the refining lot or melt from which it was produced. The number of ingots produced from one refining lot or melt constitutes a production lot. The weight range of a production lot shall be 2,000 tr. oz./ 62.21 kg. (min.) to 10,000 tr. oz./ 311.03 kg. (max.).

e. When acquired, Indium shall meet Purchase Specification P-115 (Current Edition).

2. *Packaging*

a. *Ingots.* Ingots in a production lot shall be individually wrapped in a new, clean, transparent polyethylene bag which has a minimum thickness of 0.004 inches (4 mil.). Both ends of the bag shall be closed by heat sealing. The packaged ingot shall be wrapped in cushioning material to prevent movement and damage of the material during shipment. IT IS IMPERATIVE THAT THE SURFACES OF INDIUM INGOTS DO NOT TOUCH EACH OTHER SINCE THEY WILL FUSE (COLD WELD) TOGETHER.

b. *Boxes.* Each box from the supplier shall be the same size, shall meet the requirements of the purchase specification and contract, and shall contain either a maximum of twenty 100 tr. oz. ingots or six 10 kg. ingots with a total net weight of approximately 63 kg. (2,000 tr. oz.). A copy of the weight certificate and the ingot analysis report for the contents shall be placed in each box prior to closure. The box shall be sealed by nails, and banded around the girth of the box by two steel straps. The clamp applied to the band shall be located on the side of the box, not on the top or bottom.

**APPENDIX 4-A****STORAGE OF INDIUM METAL**

c. Indium ingots will be received for storage on new, flat, wooden pallets, normally with three or five boxes/pallet.

**3. Marking**

a. *Ingot.* Each ingot in a refining lot or melt shall be permanently marked or stamped with the following information:

- (1) The name Indium, or the chemical symbol, In
- (2) A unique refining or melt lot number and serial number
- (3) The producer's name or alpha code

(a) All markings for each ingot shall be located in the same place, either the top or the bottom of the ingot.

(b) The markings shall be a minimum of 1/4 inch for letters and numerals. Markings must be legible.

b. *Boxes.* Sufficient aluminum tags, conforming to the requirements of the Defense National Stockpile Identification Specification T-1 - Tags: Aluminum, Embossed, latest revision, shall be affixed to each box and shall be marked with the following information.

- (1) Name of Material
- (2) Form
- (3) Grade
- (4) Type
- (5) Production Lot Number
- (6) Box Number
- (7) Name of Producer
- (8) Country of Origin
- (9) Gross Weight (Pounds Avoirdupois/Kilograms)
- (10) Net Weight (Troy Ounces or Kilograms)
- (11) Government Contract Number

## APPENDIX 4-A

## STORAGE OF INDIUM METAL

## (12) Defense National Stockpile Purchase Specification Number and Date

(a) The net weight shall be no more than one box in a production lot. The boxes shall be serialized.

c. Identification of the material will be obtained from documents accompanying each shipment and on shipping instructions issued by the DNSC-OL. The DNSC-OL shall be notified immediately if shipments are received prior to receipt of identifying documents, if shipments are received without identifying marks, or if the markings are not in agreement with those shown on the documents and/or shipping instructions.

4. *Storage*

a. Indium ingots shall be stored indoors, in a sprinklered vault or vault like area of a warehouse.

b. Storage identity shall be maintained by contract and production lot number as indicated on each box and in shipping instructions. Complete description of each lot of indium shall be indicated on a locator card which shall be prominently displayed on and securely attached to the tier in each multi-tiered rack or stack. DNSC storage sites will use the Warehouse Material Identification Card (DNSC Form 41) for this purpose.

c. Palletized boxes shall be stored in uniform multi-tiered racks or be floor stacked if the total quantity of material is low enough to facilitate the taking of an inventory at any time by physical count and computation.

d. Storage will be kept at least thirty-six inches below automatic sprinkler heads. A minimum clearance of twenty-four inches shall be maintained between stored material and all walls for inspection.

5. *Precautions To Be Taken*

a. *Health.* None.

b. *General.* Rough handling may cause extensive damage to wooden boxes or pallets. When being received, if any of the boxes show evidence of damage, the box(es) shall be opened to determine the extent of such damage. If there is no damage to the material, the box(es) shall be returned as nearly as possible to its original condition prior to being placed in permanent storage. Damaged boxes or pallets should be replaced. Severe damage shall be reported in the usual manner through the media of an Transportation Discrepancy Report. Proper care shall be exercised in handling and shipping to avoid damage.

6. *Security*

**APPENDIX 4-A**

**STORAGE OF INDIUM METAL**

- a. Eight seals shall be affixed through holes bored in the top and bottom corners of the box to maintain the integrity of the box contents.
- b. Entry into vault areas for the purpose of shipments, inventory or qualitative maintenance inspections will be documented by use of logs and/or custodial reports.
- c. Access into any vault areas shall be controlled by the Depot Manager of the facility where the material is stored. Depots shall implement their internal security procedures for this type of valuable material.

*7. Average Storage Factor*

- a. Ingots - 1,000-2,000 lbs./sq. foot for ground level warehouses or the weight/sq. foot rated for the warehouse the material is stored in.

FOR ADDITIONAL INFORMATION ON THIS COMMODITY REFER TO THE MATERIAL SAFETY DATA SHEET OR THE MOST RECENT PURCHASE SPECIFICATION.